



APPLE //c FLAT PANEL DISPLAY TECHNICAL PROCEDURES

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Apple //c Flat Panel Display Technical Procedures

Section 1

Troubleshooting

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Introduction

The Apple //c Flat Panel Display consists of the following electronic replaceable modules:

1. The Liquid Crystal Display (LCD)
2. The contrast card
3. The connector box
4. The ribbon cable

The Symptom Table on the following page shows possible failure symptoms and an action to be taken to rectify the problem. The best way to use this table is:

1. Look on the chart to find the symptom shown by the defective Flat Panel Display.
2. Try the recommended actions in the order in which they are listed.



SYMPTOM	ACTION
NO DISPLAY	Check that all connectors are secure inside the display panel. Check that the ribbon cable is connected inside the connector box. Replace the Liquid Crystal Display Replace the connector box. Replace the ribbon cable
NOT ABLE TO ADJUST CONTRAST	Replace the contrast card
INVERTER SWITCH NOT WORKING	Replace the contrast card
GARBAGE DISPLAY	Replace the connector box Replace the Liquid Crystal Display Replace the contrast card



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Section 2

Diagnostics

NOTE: USE THE APPLE //c DIAGNOSTIC DISKETTE (VIDEO TEST) TO TEST THE FLAT PANEL DISPLAY. REFER TO THE APPLE //c TECHNICAL PROCEDURES IF YOU DO NOT KNOW HOW TO USE THE DIAGNOSTIC DISKETTE.



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Section 3

Take-apart

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Introduction:

The Flat Panel Display is a peripheral product for the Apple //c Computer. It is made up of two major modules: the display panel (Figure 1, #1) and the connector box (Figure 1, #2). Figure 1, #3 shows the flat ribbon cable which connects the two modules. The Flat Panel Display is powered by the Apple //c extended video port; no additional power source is required.

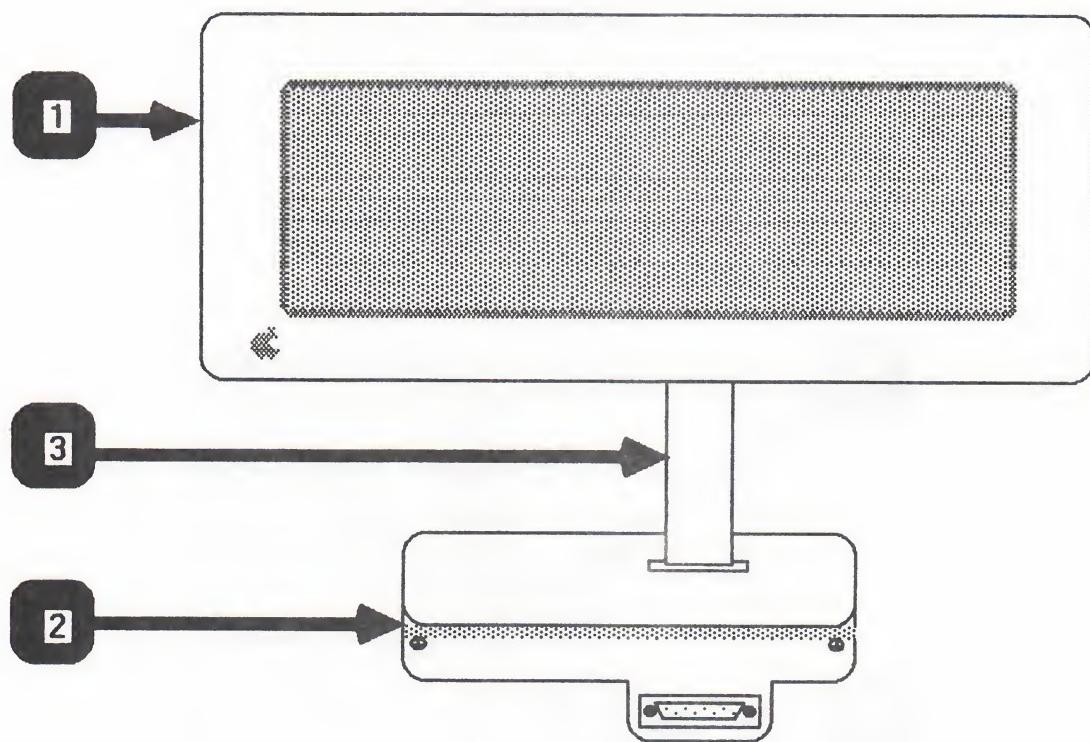


FIGURE 1

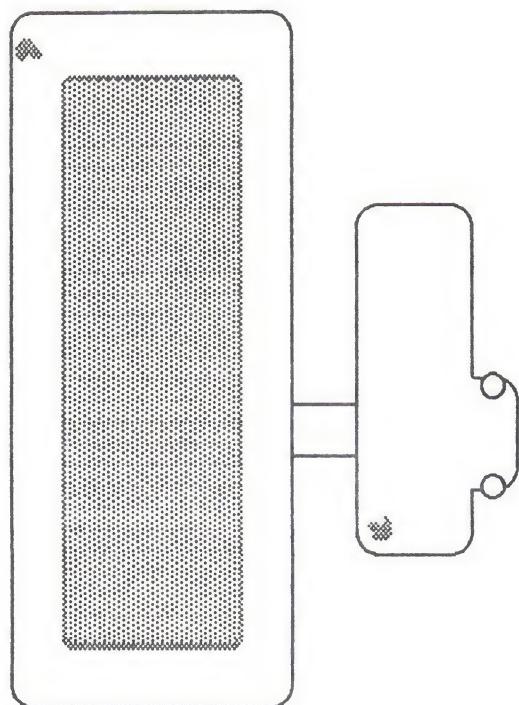


FIGURE 2

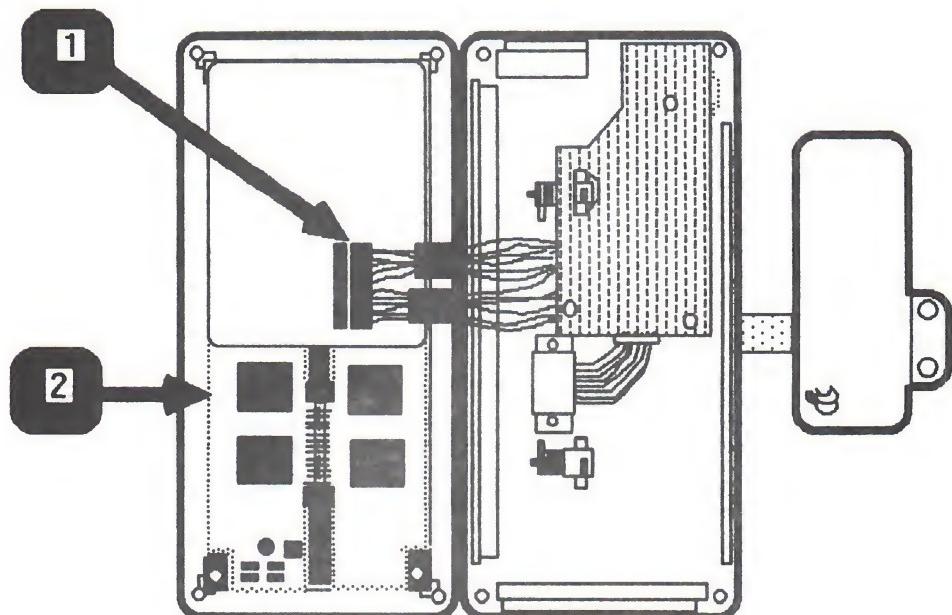


FIGURE 3



Opening the Flat Panel Display Case

1. Place the Flat Panel Display, face down, on a protective foam pad.
2. Remove the four Phillips screws from the corners of the case back.

NOTE: There is a cable inside the case which connects the front half to the back half. This cable is located at the middle of the display and is about two inches long.

3. Flip the panel over (lens facing up) and carefully pry the sides of the case until the front half snaps off.
4. Orient the Flat Panel Display as shown in Figure 2.
5. Turn the top half of the panel over in the same way you would open a book. (See Figure 3).

Removing the Flat Panel Liquid Crystal Display (LCD)

1. Follow the steps listed in "Opening the Flat Panel Display Case" (above).
2. Disconnect the contrast card connector (Figure 3, #1) from the LCD (Figure 3, #2).
3. Carefully pry the flat panel LCD (Figure 3, #2) out of the case.
4. If the case lens comes loose from the front panel, follow these steps to repair it:
 - a) Place the lens in the panel so that the raised side protrudes through the front of the panel.
 - b) Press down on the lens until the plastic posts come through the holes at the borders of the lens.
 - c) Put a small drop of fast drying glue for plastic bonding (preferably LOCTITE) on each plastic post. Hold the lens firmly against the panel until the glue is dry.
 - d) Use a plastic lens cleaner to clean both sides of the lens.

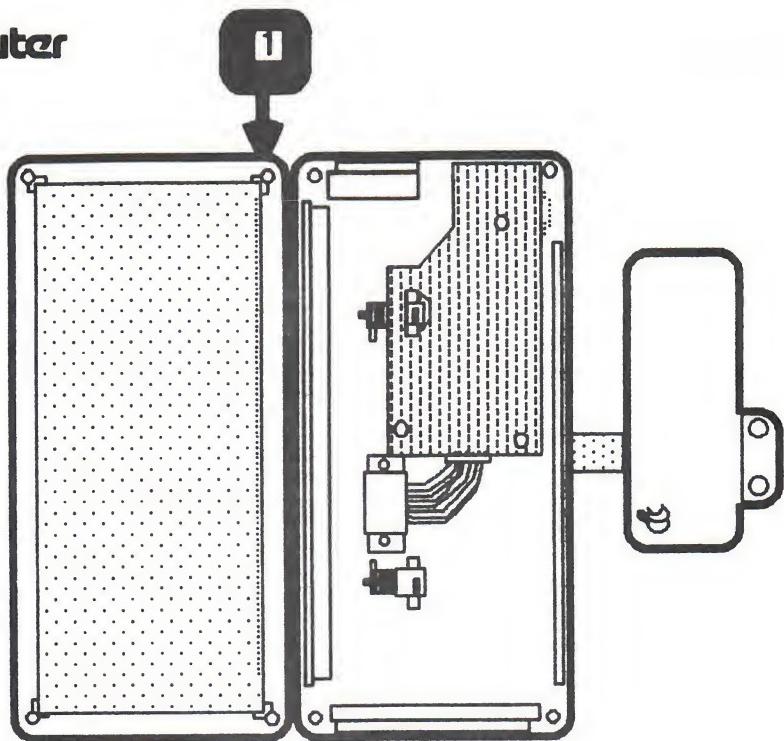


FIGURE 4

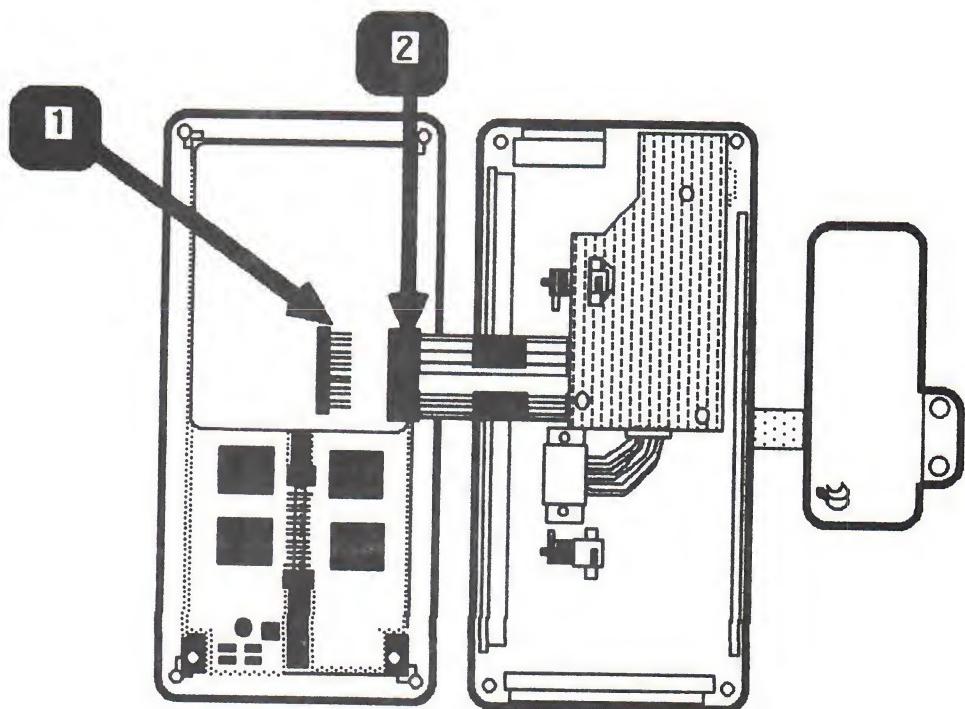


FIGURE 5



Installing the Flat Panel Liquid Crystal Display (LCD)

1. Place the both halves of the Flat Panel Display case on a protective foam pad, and orient them as shown in Figure 4.

NOTE: The Apple logo should be positioned as shown in Figure 4, #1.
2. Place the LCD in the front panel with the connector (Figure 5, #1) on the right half of the LCD (pins pointing to the right).
3. Press down on the LCD until it snaps into place on all sides.
4. Connect the contrast card connector (Figure 5, #2) to the LCD (Figure 5, #1).
5. Fold the LCD over and onto the back half of the Flat Panel Display.
6. Press the two halves together until all fours sides snap into place.
7. Replace the Phillips screws.
8. Use the Apple //c Diagnostic Diskette (video test) to make sure that the Flat Panel Display is functioning properly.

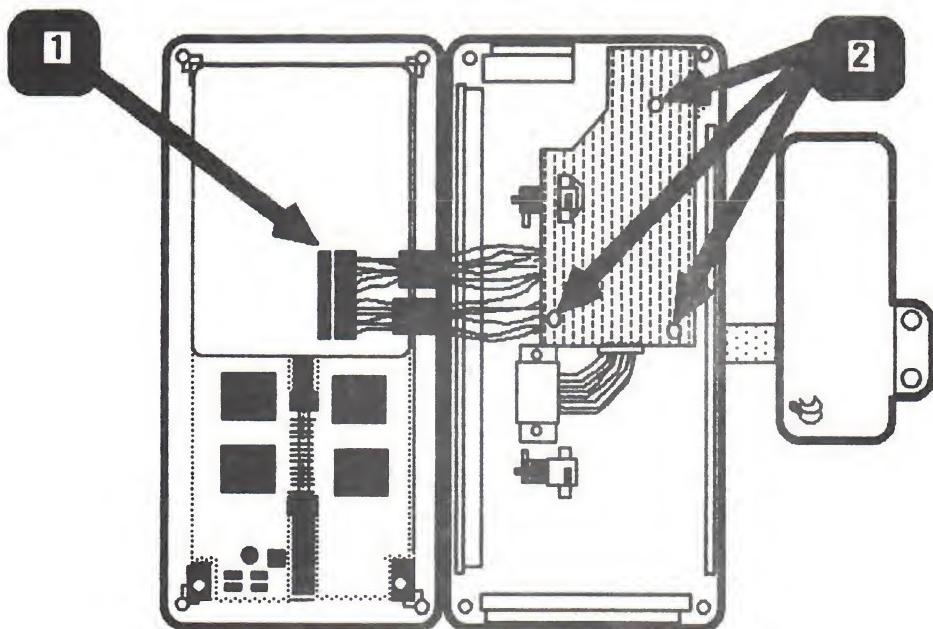


FIGURE 6

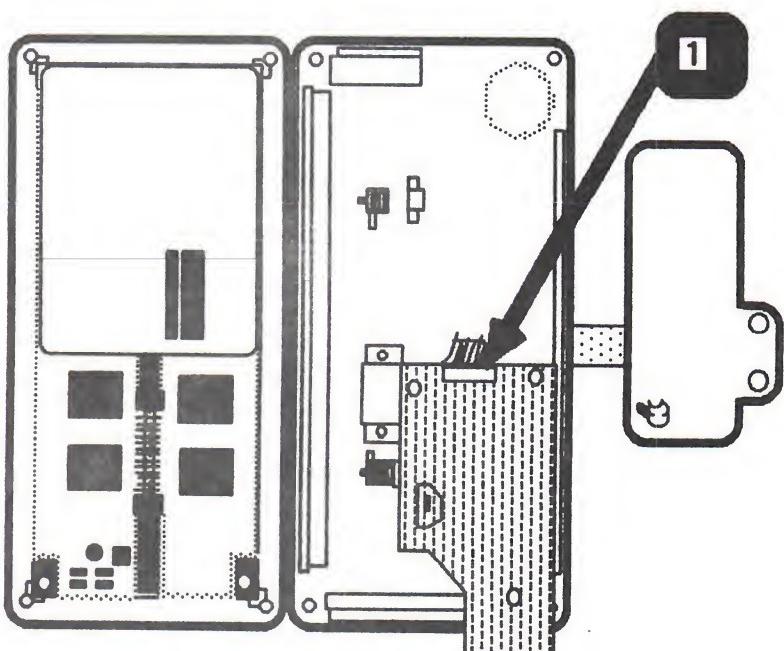


FIGURE 7



Removing the Contrast Card

1. Follow the steps listed under "Opening the Flat Panel Display Case").
2. Disconnect the contrast card connector (Figure 6, #1) from the LCD.
3. Remove the Phillips screws (Figure 6, #2) which secure the card to the case and lift the card out.
4. Flip the contrast card over so that you can easily access the ribbon cable connector (Figure 7, #1).
5. Disconnect the ribbon cable connector from the contrast card.

Installing the Contrast Card

1. Connect the ribbon cable (coming from connector box) to the contrast card with the solid side of the connector facing up. (See Figure 7, #1.)
2. Place the contrast card on the plastic support posts as shown in Figure 6.
3. Replace the Phillips screws (Figure 6, #2) to secure the card to rear panel.
4. Connect the LCD connector to the LCD. (See Figure 6, #1.)
5. Fold the LCD over and onto the back half of the Flat Panel Display.
6. Press the two halves together until all fours sides snap into place.
7. Replace the Phillips screws.
8. Use the Apple //c Diagnostic Diskette (video test) to make sure the Flat Panel Display is functioning properly.



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Removing the Inverter Switch Cover

1. Follow the steps listed under "Remove the Contrast Card."

NOTE: The inverter switch cover may stay with the contrast card as you remove it. If it is not on the card, it is inside the flat panel case.

2. Remove the inverter switch cover from inside the flat panel case or from the contrast card, whichever the case may be.

Installing the Inverter Switch Cover

1. Place the switch cover in the slot located at the upper left corner of the back case. There is only one way the switch cover will fit.
2. Follow the steps listed under "Replacing the Contrast Card".

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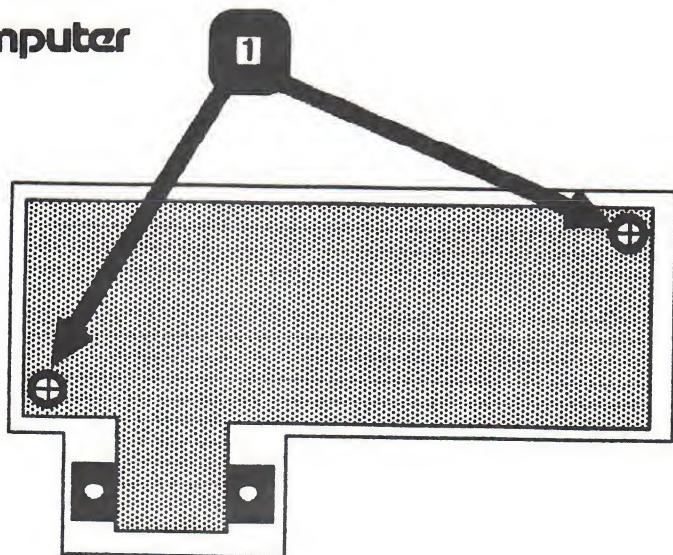


FIGURE 8

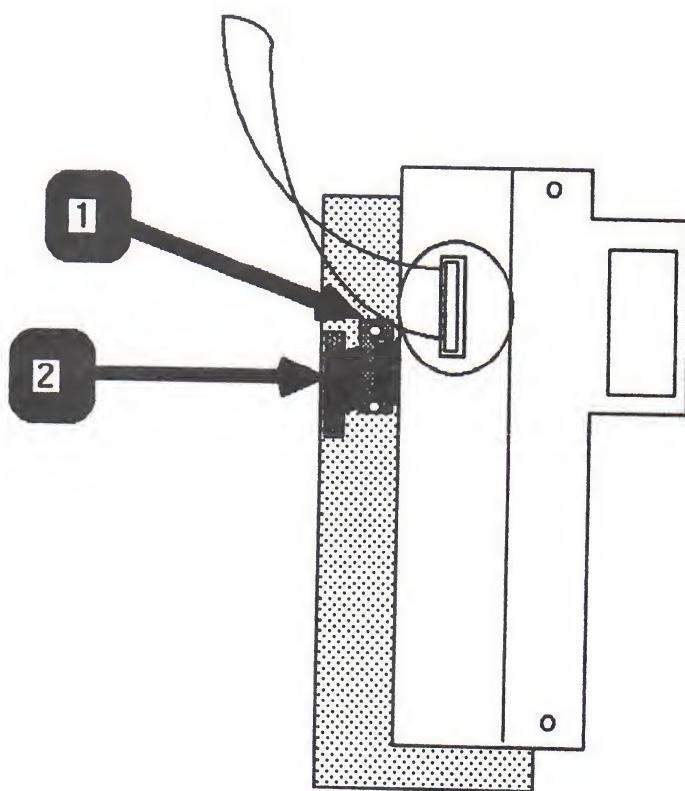


FIGURE 9



Removing the Connector Box

1. Remove the two Phillips screws located at either side of the connector box case.
2. Carefully pry the case open.
3. Remove the two Phillips screws (Figure 8, #1) which secure the metal connector box to the case.
4. Push the DB-15 connector toward the inside of the plastic case until you can grasp the edges of the metal connector box.
5. Use a jeweler's Phillips screwdriver to remove the screws located at either side of the cable clamp (Figure 9, #1).
6. Disconnect the ribbon cable (Figure 9, #2) from the connector box, then lift the box completely out of the case.

Installing the Connector Box

1. Connect the ribbon cable to the socket at the bottom of the metal connector box. Push the connector down into the socket as far as it will go. (See Figure 9, #2.)
2. Replace the cable clamp as shown in Figure 9, #1.
3. Place the connector box inside the case so that the DB-15 connector protrudes through the opening at the bottom of the case.
4. Replace the screws (Figure 8, #1) to secure the connector box to its plastic case.
5. Place the rear panel on the case and press until it snaps into place.
6. Replace the Phillips screws on both sides of the case.

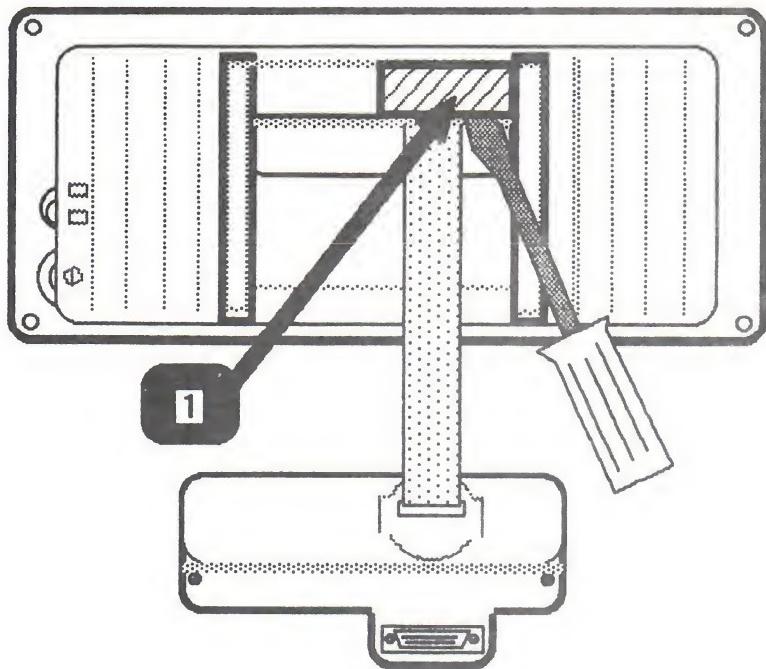


FIGURE 10

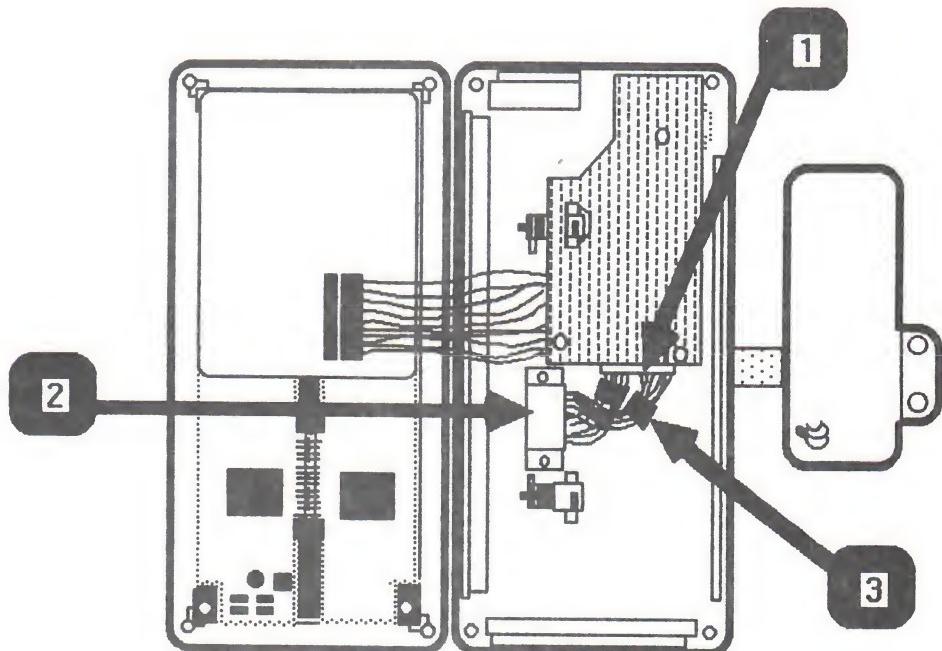


FIGURE 11



Removing the Ribbon Cable

1. Place the Flat Panel Display face down on a protective foam pad and orient it as shown in Figure 10.
2. Use a flatblade screwdriver to pry off the flat panel cable brace (Figure 10, #1).
3. Follow the steps listed under "Opening the Flat Panel Display Case".
4. Disconnect the ribbon cable connector (Figure 11, #1) from the contrast card.
5. Remove the two Phillips screws which secure the ribbon cable clamp (Figure 11, #2) to the Flat Panel Display case. Lift the clamp off the plastic alignment posts.

IMPORTANT: IF THERE ARE TWO TOROID RINGS ON THE RIBBON CABLE AS SHOWN IN THE FIGURE 11, #3, CAREFULLY SQUEEZE THE RINGS (ONE AT A TIME) WITH A PAIR OF PLIERS UNTIL THE RINGS BREAK OFF THE CABLE.

6. Slide the cable out through the opening in the back case of the flat panel.
7. Follow the steps listed under "Removing the Connector Box".
8. Slide the toroid ring (Figure 12, #1) over the connector box cable and set it aside.
9. Use a small flatblade screwdriver to pry the sides of the plastic cable brace (Figure 12, #2) until it is free from the case.
10. Slide the ribbon cable out (toward the inside of the case) through the opening in the connector box case.

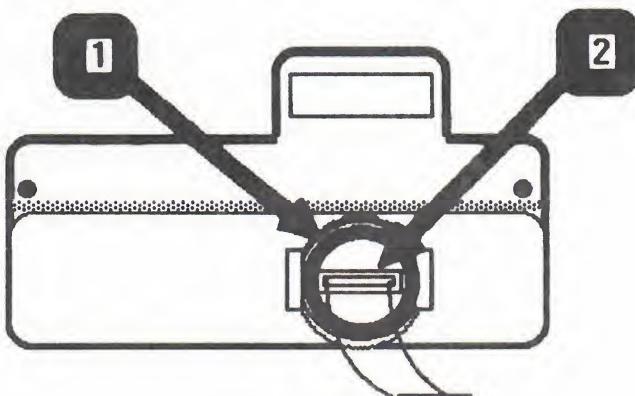


FIGURE 12

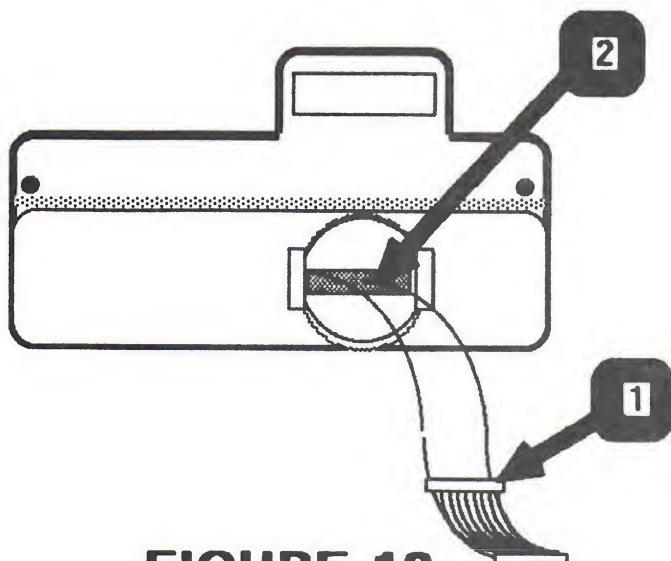


FIGURE 13

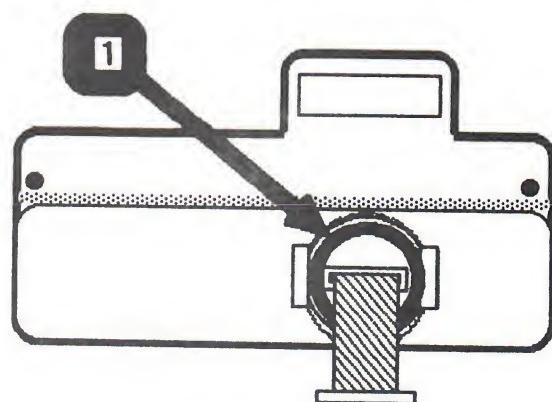


FIGURE 14



Installing the Ribbon Cable

1. Slip the end of the ribbon cable (without the plastic cable brace) through the opening on the inside of the connector box case. (See Figure 13.)

Pull the cable through the connector box case until the plastic cable brace (Figure 13, #1) meets the slot (Figure 13, #2) on the inside of the case.

2. Push the plastic cable brace into its fitting (slot) until it is snug.

NOTE: The back side of the plastic cable brace should protrude through the outside of the connector box case.

3. Slip the toroid ring (Figure 14, #1) back over the ribbon cable.
4. Follow the steps listed under "Installing the Connector Box".

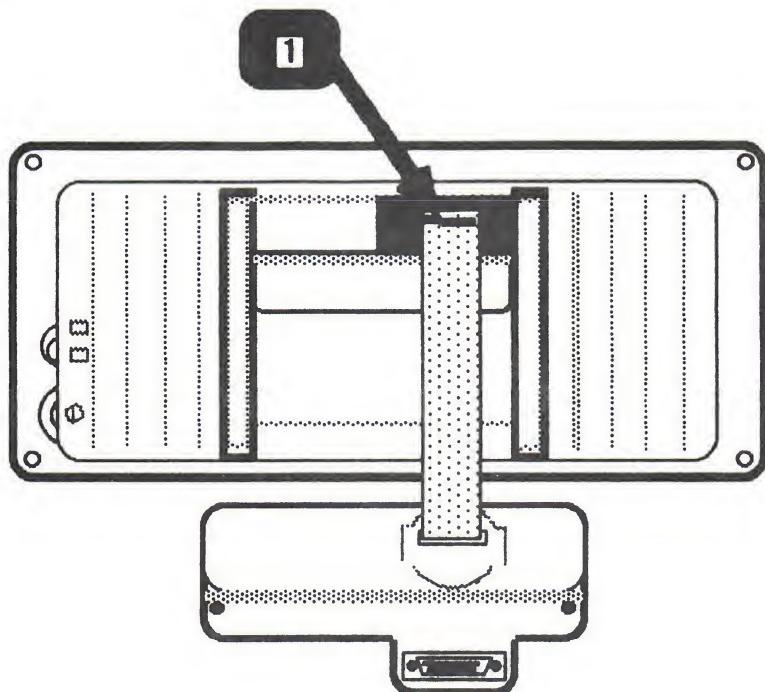


FIGURE 15

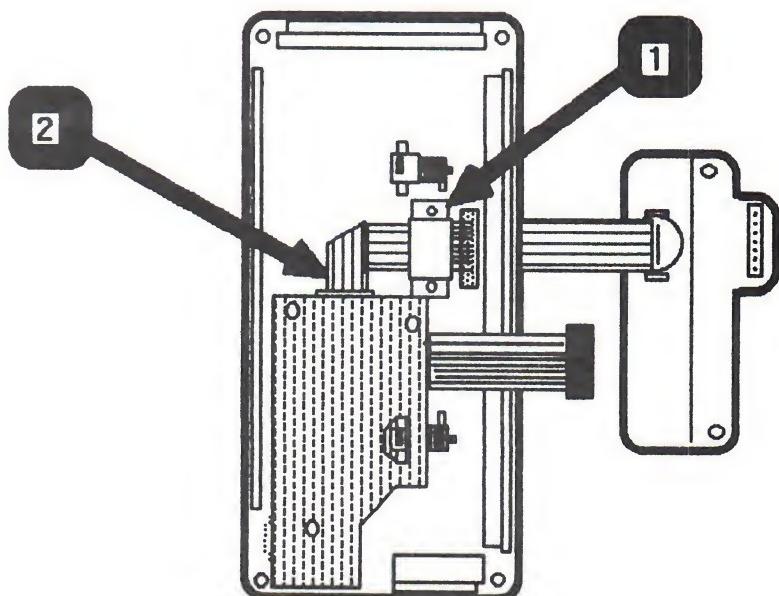


FIGURE 16



6. Orient the connector box and the back of the flat panel case as shown in Figure 15.
 7. Slide the other end of the ribbon cable through the opening in the back of the flat panel case. Pull the cable through until the metal clamp on the insulation (white rubber coat) is just inside the opening in the case. (See Figure 15, #1).
- NOTE:** The connector box should no more than 1/2 inch away from the flat panel.
8. Snap the plastic cable brace back into place on the back of the flat panel. (See Figure 10, #1.)
 9. Flip the back side of the flat panel over and replace the metal cable clamp (Figure 16, #1).
 10. Connect the ribbon cable to the contrast card as shown in Figure 16, #2.
 11. Follow steps 4 through 8 of "Installing the Liquid Crystal Display (LCD)" to reconnect the LCD and close the flat panel display case.



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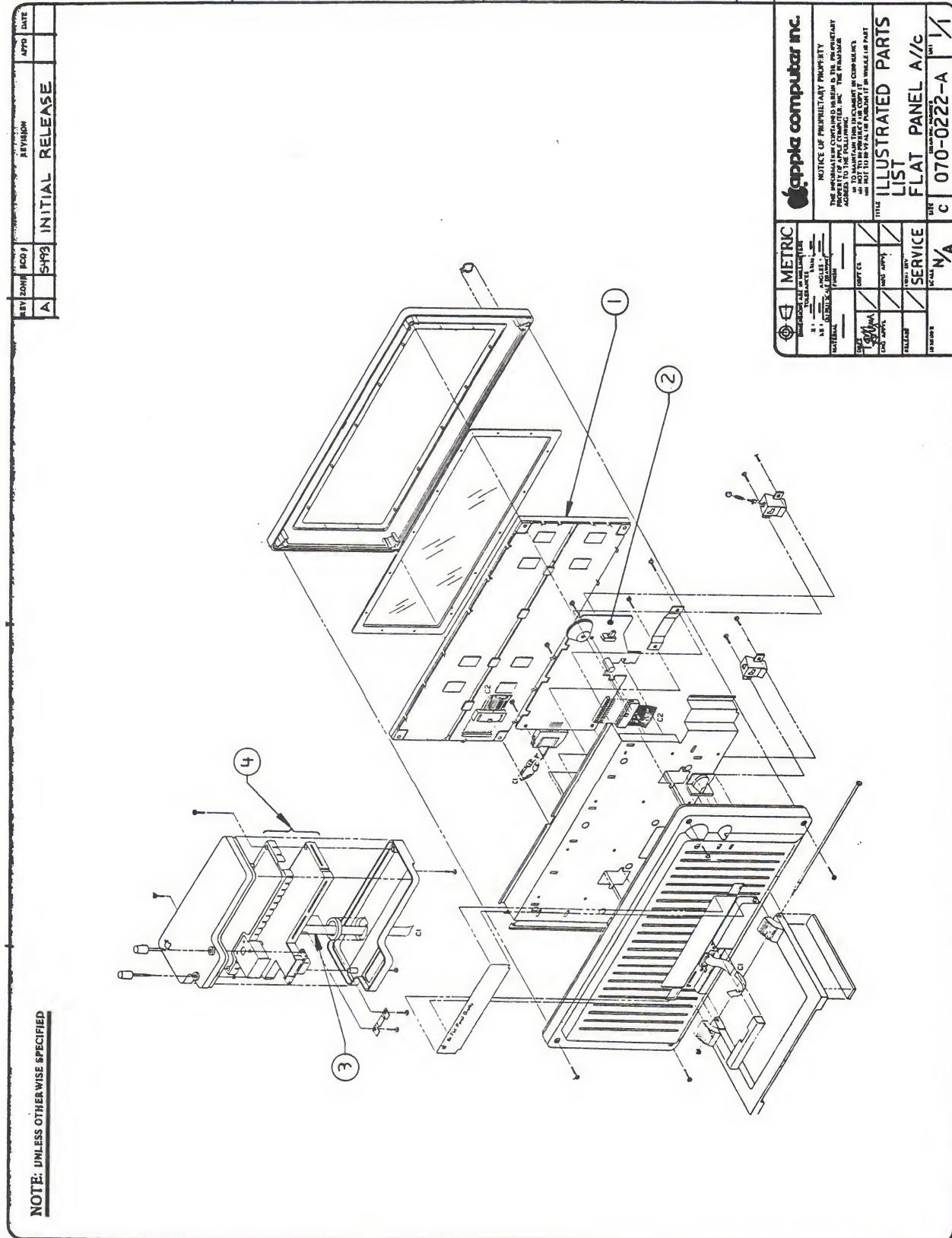
Section 4

Illustrated Parts List

The figures and lists below include all piece parts that can be purchased separately from Apple for the Flat Panel Display, along with their part numbers. These are the only parts available from Apple. Refer to your Apple Service Programs manual for prices.

Contents:

Illustrated Parts List.....	4.1
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Flat Panel Display

Item	Part No.	Description
1	076-8128	Flat Panel Display, LCD
2	661-0281	Contrast Card, Flat Panel Display
3	590-0325	Cable, Assembly
4	661-0282	Connector Box, Flat Panel Display

